new music

by marina la palma

How do you make a computer that can really interact with a human being?

ow to make a computer talk with us . . . not just to things like "third floor" or even seven two one one ne three." By "talk" I mean at complex process of analy- of speech and the synthesis new speech in response. ow to embed in a machine e authority of a sufficiently mplex code-matrix and the xibility of a staggeringly high mber of variants, recom- nations and exceptions—in ort, a *langue* (which linguis- s maintains as a sort of Ideal Transcendental category, ever existing in any one mo- ent or instance but always *in otentia*). And how to have the achine then generate some- ing resembling *parole*, the momentary spontaneous mani- estations (theoretically infinite number), individual utter- nces that another such unit ith the same capacity in- tance will recognize as intel- gible and relevant.

In short, how to make a omputer that can really inter- ct with a human being, pro- ducing its half of something re- embling at least the rudi- ents of a human conversa- ion. The Military establish- ent works on the problem; he entertainment industries work on it; its dry rustling is eard in the "groves" of academia. Great difficulty. Lit- le real success. Well, it took a couple of million years for Homo sapiens to get her brain to the point of development and complexity to operate at the remarkable level we call language. It's hard to imagine the process could be recap- itulated in 40 years. Science jockeys at the nature/culture boundaries, eager to explore them, undefined though they are.

How much is biological and how much cultural; how much do our sensory apparati define our perception and under- standing of the world and how much is due to culture, how much does culture do, and to what extent isn't culture a complex product of our biol- ogy . . . and so on. The ques- tion of this boundary between biological givens and cultural conditioning is extremely relev- vant to current music produc- tion and reception in a number of ways. So I recently looked at some of the literature in ex- perimental science on human reception of music.

Experimental science in the last 100 years or so has some- times asked interesting ques- tions in this area. Some of the procedures along the way have yielded technology that con- tributes to contemporary music-making. In order to con- trol parameters of acoustic pro- duction and isolate factors of acoustic perception, scientists developed devices that even- tually found their way into popular use (the vocoder is an example). Cooperation among composers and scientists (at large institutions—Stanford, MIT, IRCAM) occasionally pro- duces something of interest musically.

Psychoacoustics, a subset of psycho*physics*, is a field of research concerned with rela- tions between objective physi- cal properties of sensory stim- uli and subjective psychologi- cal responses evoked by them. From that discipline we have *The Psychology of Music* edited by Diana Deutsch of UC San Diego. (Academy Press/HBJ, 1982). One section is devoted to questions of scales, intervals and tuning sys- tems. For instance, are scales necessary? Given that present Western music utilizes a rela- tively small set of discrete pitch relationships, is the use of dis- crete intervals universal? (Ethnomusic studies show that it pretty much is.) Then does the 12-note chromatic scale represent a norm or the limit of useful perceptual subdivisions of the octave? Articles deal with topics such as: How is pitch information internally represented at different levels of abstraction? What types of information can be discarded in the synthetic replication of a sound without distorting per- ceived timbre? (That is: How much of the complex acoustic activity going on in a complex tone is actually used by the hu- man ear to categorize the sound's timbre?)

The latter half of the 19th Century saw the beginning of modern neurology and the development of concepts of localization of function within the brain. Now the shift is toward seeing how interrelated all the functions are, as well as discoveries about the "re- routing" of functions or the regeneration of a capacity by use of another part of the brain in cases where one location has suffered damage. Another book was recommended to me by composer and critic Michael Nyman. (It was after a presentation at the Guggen- heim of excerpts of *The Man Who Mistook His Wife for a Hat*, an opera for which Nyman did the score, based on Oliver Sacks' fascinating literary case study of a man with a neurologi- cal disorder, who uses music to orient himself in the world.) *Music and the Brain: Studies in the Neurology of Music* edited by MacDonald Critchley and R. A. Henson (London: Wm. Heinemann, 1978) presents results of studies of actual psy- chomotor responses to music—skin conductivity, pulse rate, muscular flexion. Documentation and illus- trations include brain-wave patterns of subjects listening to various types of music.

Questions asked include: Since the majority of cultures employ scales, what is their role in the basic perception of music? What does that tell us about the functioning of the brain? I was most fascinated by an article that examined the possible neurological basis of our notions of consonance and dissonance of simultaneously presented musical sounds (har- mony). This too is fairly univers- al, though, "tastes differ" to some extent for the amount of "roughness" that is ignored, tolerated, or enjoyed. A tenta- tive conclusion had to do with a possible preference for tones with consonant periodicity in their overtones because that implies simultaneous neural fir- ing patterns by the brain in perceiving them (I dubbed it the "lazy brain" theory).

Another interesting volume: *Music, Mind and Brain: the Neuropsychology of Music* edited by Manfred Clynes of the State Conservancy in Syd- ney, Australia (Plenum Press, 1982). The two fields, which in the above two books are seen as distinct, seem here to overlap somewhat. The field is quite international. Reading this material, I assure you, was not a breeze. Some of it is in mathematical representations far beyond my scope. However, it seems worthwhile to dip into what the "sciences" are looking at and concluding about these questions, for they are not unconnected to con- cerns in aesthetics, and other issues in the arts. Similar ques- tions are on the table in current discourse arising out of (post)semiotics.

For instance, in Lacanian terms, there is the Real (some- thing that exists a priori), but we can never touch on it directly except through our language, which is totally culture-bound. The human in- fant, a unitary being, first forms a dyad with the nurturing "parent" figure which develops into an Other as the child becomes as entity for itself by being reflected back as singular and capable of elicit- ing a response from this other. This dyad exists in the, let us say, two-dimensional world of the Imaginary. It is only the in- terjection of a third term through which a three- dimensional space comes into being, the Symbolic Order of Lacan. It is in fact the entry into language that constituted our entry into the Symbolic Order for Lacan.

The thing is not to get dis- couraged. One just keeps reading across the incom- prehensible parts and soon en- ters other zones of common speech that "make sense." Af- ter awhile things begin to tick in the mind, I mean brain, er, synapse, neural firing patterns . . . . □